

1. A low NO<sub>x</sub> producing furnace having walls and a floor comprising:

one or an array of burners on a wall or the floor of the furnace that introduce a combustible fuel gas lean-air mixture into a combustion zone adjacent to the burner or burners; and

one or one or more arrays of secondary fuel gas nozzles located separate and remote from the burner or burners that introduce secondary fuel gas into the furnace whereby the secondary fuel gas mixes with flue gases in the furnace, combusts with excess air, lowers the temperature of the burning fuel gas and reduces the formation of NO<sub>x</sub>.

2. The low NO<sub>x</sub> producing furnace of claim 1 wherein the one or one or more arrays of secondary fuel gas nozzles are positioned on one or more walls or the floor of the furnace, or both.

3. The low NO<sub>x</sub> producing furnace of claim 1 wherein the one or one or more arrays of secondary fuel gas nozzles direct secondary fuel gas to locations in the furnace on the opposite side of the combustion zone from the burner or burners.

4. The low NO<sub>x</sub> producing furnace of claim 1 wherein the furnace contains an array of burners in at least one row or column and an array of secondary fuel gas nozzles.

5. The low NO<sub>x</sub> producing furnace of claim 1 wherein the burners are disposed in an array on the floor of the furnace and the secondary fuel gas is discharged from one or an array of secondary fuel gas nozzles on the floor of the furnace.

6. The low NO<sub>x</sub> producing furnace of claim 1 wherein the burners are disposed in an array on the floor of the furnace and the secondary fuel gas is discharged from one or an array of secondary fuel gas nozzles on the walls of the furnace.

7. The low NO<sub>x</sub> producing furnace of claim 1 wherein the burners are disposed in an array on the floor of the furnace and the secondary fuel gas is discharged from one or an array of secondary fuel gas nozzles on the floor of the furnace and from one or an array of secondary fuel gas nozzles on the walls of the furnace.

8. The low NO<sub>x</sub> producing furnace of claim 1 wherein each secondary fuel gas nozzle has at least one fuel delivery opening therein that discharges secondary fuel gas toward or away from the floor or walls of the furnace.

9. The low NO<sub>x</sub> producing furnace of claim 1 wherein each secondary fuel gas nozzle has multiple fuel delivery openings positioned to discharge fuel gas toward or away from the floor or walls of the furnace, or both.

10. The low NO<sub>x</sub> producing furnace of claim 1 wherein the furnace is a radiant wall furnace.

11. The low NO<sub>x</sub> producing furnace of claim 1 wherein the furnace is a vertical cylindrical furnace.

12. The low NO<sub>x</sub> producing furnace of claim 1 wherein the furnace is a cabin furnace, a boiler or other similar furnace.

13. A method of burning fuel gas and air in a furnace whereby flue gases of reduced NO<sub>x</sub> content are formed comprising the steps of:

(a) providing a fuel gas lean-air mixture to one or an array of burners disposed on a wall or the floor of the furnace;

(b) causing the fuel gas lean-air mixture to be discharged from the burner or burners whereby the mixture is burned at a relatively low temperature in a combustion zone and flue gases having low NO<sub>x</sub> content are formed therefrom; and

(c) providing secondary fuel gas to one or one or more arrays of separate and remote secondary fuel gas nozzles located whereby the secondary fuel gas is discharged from the secondary fuel gas nozzles, mixes with flue gases in the furnace, combusts with excess air from the burners, lowers the temperature of the burning fuel gas and reduces the formation of NO<sub>x</sub>.

14. The method of claim 13 wherein the secondary fuel gas nozzles discharge secondary fuel gas to a location in the furnace on the opposite side of the combustion zone from the burners.

15. The method of claim 13 wherein the burners are disposed in an array on the floor of the furnace and the secondary fuel gas is discharged from one or an array of secondary fuel gas nozzles on the floor of the furnace.

16. The method of claim 13 wherein the burners are disposed in an array on the floor of the furnace and the secondary fuel gas is discharged from one or an array of secondary fuel gas nozzles on the walls of the furnace.

17. The method of claim 13 wherein the burners are disposed in an array on the floor of the furnace and the secondary fuel gas is discharged from one or an array of secondary fuel gas nozzles on the floor of the furnace and from one or an array of secondary fuel gas nozzles on the walls of the furnace.

18. The method of claim 13 wherein each secondary fuel gas nozzle has at least one fuel delivery opening therein to discharge secondary fuel gas toward or away from a wall or walls of the furnace.

19. The method of claim 13 wherein each secondary fuel gas nozzle has multiple fuel delivery openings positioned to discharge fuel gas toward or away from the furnace wall, or both.

20. The method of claim 13 wherein the furnace is a radiant wall furnace.

21. The method of claim 13 wherein the furnace is a vertical cylindrical furnace.

22. The method of claim 13 wherein the furnace is a cabin furnace, a boiler or other similar furnace.